## Microwaves for Measuring Moisture

Monitoring grain moisture is important so that growers can decide when to harvest. If harvesting's done when moisture levels are too high, more grain may be damaged by machinery during threshing and shelling. But if harvesting occurs when the moisture level is too low, more grain may be damaged by kernel breakage and lost because of shattering and shelling. Moisture is also critical in determining how long grain can be safely stored, and it helps determine selling price.

A new technique uses an antenna to transmit microwaves into commodities such as corn, wheat, barley, or soybeans. How the waves are altered as they pass through the grains or beans spells out how much moisture is present.

The new procedure automatically adjusts for different commodities, eliminating the need to change calibrations. It also compensates for variances in grain density and temperature.

The technique could provide continuous moisture monitoring for use on combines and on grain-handling or conveying equipment. Scientists believe the system could be cost effective if developed and commercialized. *Stuart O. Nelson, USDA-ARS Quality Assessment Research Unit, Athens, Georgia; phone (706) 546-3101, e-mail sonelson @qaru.ars.usda.gov.*

## Double-Duty Dust-Remover

An electrostatic system that keeps surface dust near its source also has a sterilizing effect on disease-causing bacteria. Originally designed to trap dust and microorganisms in poultry areas, the system transfers a strong negative electrostatic charge to airborne particles and collects them on grounded plates or other surfaces.

The electrostatic system has reduced *Salmonella* and other airborne pathogens by 80 to 95 percent in experimental and commercial hatching cabinets. Airborne dust in poultry areas has been reduced by 50 to 95 percent. When used within 6 inches of biofilms—coatings formed by bacteria that stick to surfaces and form a protective layer—the system has reduced them by up to 99.8 percent and killed 99 percent or more of airborne *Salmonella.*

Biolon, Inc., of Athens, Georgia, collaborated on the research and holds an exclusive license to manufacture and market this technology. *Bailey W. Mitchell, USDA-ARS Southeast Poultry Research Laboratory, Athens, Georgia; phone (706) 546-3443, e-mail bmitchell @seprl.usda.gov.*

## Poultry Litter Ash Perks Up Plants

Researchers have found an added bonus to burning poultry litter for electricity: The residue makes good fertilizer. This alternative use for poultry litter could reduce production costs for farmers while promoting better plant growth and helping the environment. Studies have shown the total concentration of phosphorus in litter ash to be higher—but less water soluble—than in unburned litter. Ash is also lighter than poultry litter and easier to transport to areas where such fertilizer is needed.

Wheat plants grown in limed and nonlimed soil fertilized with poultry ash or potassium phosphate produced similar yields. But plants receiving litter ash had higher amounts of phosphorus in their tissues than did plants fertilized with potassium phosphate. This indicates that the nutrient from the ash was readily available for uptake by plant roots. Further studies are needed to determine optimal levels of litter ash for commercial production of wheat and other agricultural crops and to establish the economic value to farmers. *Eton E. Codling, USDA-ARS Animal Manure and By-Products Laboratory, Beltsville, Maryland; phone (301) 504-5708, e-mail codlinge@ba.ars.usda.gov.*

## Berries Curb Cancer Cells

Fruits and vegetables contain a wide array of compounds—phytonutrients—reported to have anticancer activity in cell cultures. And berries are reportedly rich in antioxidant phytonutrients. So researchers have been probing several berries, as well as muscadine grapes, for their ability to inhibit growth of cell lines originally cultured from breast and cervical tumors. Preliminary studies show that various extracts from raspberries, strawberries, and muscadine grapes cut growth of breast cancer and cervical cancer cell lines by more than half. The scientists are using various solvents and different parts of the fruit—such as juice, skin, and seeds. They then send samples to Dr. Lyndon Larcom at Clemson University in South Carolina for assays on the cancer cell lines.

Extracts from blueberries and blackberries weren't effective against the two cervical cancer cell lines tested, but they suppressed breast cancer cell growth—each fruit suppressing a different cell line. Specific muscadine grape extracts suppressed a third breast cancer cell line much more than they suppressed a line of healthy cells from the same donor. These findings deal with suppression of cancer cells in the second stage of development. The researchers are also assaying berry and grape extracts for their ability to prevent mutations. *David E. Wedge, USDA-ARS Natural Products Utilization Research Unit, Oxford, Mississippi; phone (662) 915-1137, e-mail dwedge@ars.usda.gov.*

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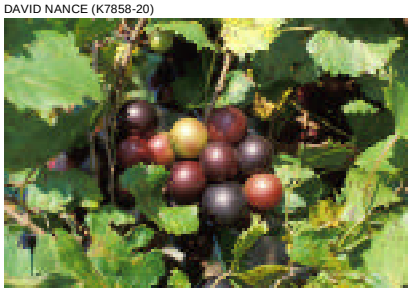

**Certain extracts from muscadine grapes suppress breast cancer cell growth.**